

U.S.S.N. 09/909,574

Filed: July 20, 2001

AMENDMENT AND RESPONSE TO OFFICE ACTION

In the Claims

1. (currently amended) A method for producing polyhydroxyalkanoates comprising providing ~~genetically engineered~~ organisms which express enzymes selected from the group consisting of ~~diol oxidoreductase, aldehyde dehydrogenase,~~ acyl-CoA transferase, acyl-CoA synthetase, β -ketothiolase, acetoacetyl-CoA reductase, and PHA synthase,

~~providing diols which can be converted into hydroxyalkanoate monomers by enzymes expressed by in the organisms, wherein~~

the organisms are ~~transformed with genes encoding enzymes~~ genetically engineered to express genes that encode enzymes selected from the group consisting of diol oxidoreductase and aldehyde dehydrogenase, wherein

diol oxidoreductase and aldehyde dehydrogenase convert 1,4-butanediol diols into hydroxyalkanoate monomers, wherein the monomers are selected from the group consisting of 4-hydroxybutyrate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxypropionate, and 3-hydroxyhexanoate, having a weight-average molecular weight (Mw) of at least 300,000, and

~~culturing the organisms under conditions wherein the hydroxyalkanoate monomers are polymerized to form polyhydroxyalkanoates~~ having a weight average molecular weight (Mw) of at least 300,000.

2. (original) The method of claim 1 wherein the diol is 1,6-hexanediol and the hydroxyalkanoate monomer is 6-hydroxyhexanoate.

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3. (original) The method of claim 1 wherein the diol is 1,5-pentanediol and the hydroxyalkanoate monomer is 5-hydroxyvalerate.
4. (currently amended) The method of claim 1 wherein the diol is 1,4-butanediol and the hydroxyalkanoate monomer is 4-hydroxybutyrate.
5. (canceled)
6. (currently amended) The method of claim 1 wherein the diol is 1,2-ethanediol and the hydroxyalkanoate monomer is 2-hydroxyethanoate.
7. (currently amended) The method of claim 1 wherein the diol is 1,2-propanediol and the hydroxyalkanoate monomer is 2-hydroxypropionate.
8. (original) A genetically engineered organism for use in the method of claim 1 comprising an organism which expresses the *aldH* and *dhaT* genes.
9. (original) The organism of claim 8 wherein the organism is selected from the group consisting of *Escherichia coli*, *Ralstonia eutropha*, *Klebsiella* spp., *Alcaligenes latus*, *Azotobacter* spp., and *Comamonas* spp.
10. (currently amended) A system for making polyhydroxyalkanoates comprising an organism ~~genetically engineered to that expresses express genes that encode enzymes selected~~ from the group consisting of a diol oxidoreductase, aldehyde dehydrogenase, acyl-CoA transfrase, acyl-CoA synthetase, β -ketothiolase, acetoacetyl-CoA reductase, and PHA synthase,

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wherein the organism is ~~transformed with genes encoding~~ genetically engineered to express genes that encode enzymes selected from the group consisting of diol oxidoreductase and aldehyde dehydrogenase, ~~and~~

wherein the organism can convert diols into hydroxyalkanoate monomers which are polymerized to form polyhydroxyalkanoates having a weight-average molecular weight (Mw) of at least 300,000, wherein the monomers are selected from the group consisting of 4-hydroxybutyrate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxypropionate, and 3-hydroxyhexanoate.

11-21. (canceled)

22. (new) A polyhydroxyalkanoate comprising 2-hydroxypropionate and at least one co-monomer selected from the group consisting of 4-hydroxybutyrate, 3-hydroxypropionate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxyproionate, and 3-hydroxyhexanoate, wherein the polyhydroxyalkanoate has a weight-average molecular weight (Mw) of at least 300,000.

23. (new) A polyhydroxyalkanoate comprising 2-hydroxyethanoate and at least one co-monomer selected from the group consisting of 4-hydroxybutyrate, 3-hydroxypropionate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxyproionate, and 3-hydroxyhexanoate, wherein the polyhydroxyalkanoate has a weight-average molecular weight (Mw) of at least 300,000.